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WATER RESOURCES OF THE
KANSAS CITY AREA
MISSOURI AND KANSAS

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Table 7.—Mineral constituents and related physical measurements, Kansas, Blue and Little Blue Rivers

[Analyses in parts per million except as indicated]

	Kansas River at Bonner Springs, Kans.		Blue River near Kansas City, Mo.		Little Blue River near Lake City, Mo.	
Date of collection.....	10-18-45	7-7-52	5-10-52	7-10-52	5-10-52	7-11-52
Discharge (cfs).....	2,800	6,850	99	5.5	121	16.2
Temperature (°F).....	-	78	59	86	58	78
Silica (SiO ₂).....	18	13	9.7	11	11	14
Iron (Fe).....	.12	.04	.04	.02	.04	.04
Calcium (Ca).....	95	43	84	51	79	71
Magnesium (Mg).....	24	7.4	8.1	7.3	7.1	6.1
Sodium (Na).....	100	43	14	25	14	12
Potassium (K).....	7.0					
Bicarbonate (HCO ₃).....	293	129	257	162	228	211
Carbonate (CO ₃).....	0	0	0	0	0	0
Sulfate (SO ₄).....	114	43	47	54	50	38
Chloride (Cl).....	137	53	6.5	11	8.0	8.0
Fluoride (F).....	.2	.4	.2	.4	.2	.2
Nitrate (NO ₃).....	4.3	5.3	5.6	8.6	5.9	4.9
Boron (B).....	.02	.05	.04	.10	.05	.06
Dissolved solids:						
Parts per million.....	658	310	314	276	318	310
Tons per acre-foot.....	-	-	-	-	-	-
Hardness as CaCO ₃ :						
Total.....	336	138	243	157	226	202
Noncarbonate.....	96	32	32	24	39	29
Percent sodium.....	39	40	11	26	12	12
Specific conductance (micromhos).....	1,080	476	496	413	470	438
pH.....	7.4	7.5	8.0	7.5	8.1	7.5
Turbidity.....	-	350	25	15	120	140

types. In the Republican River, which is the main stem of the Kansas River, calcium, bicarbonate, and sulfate are the predominant ions in solution. On the other hand, the Dakota sandstone in north-central Kansas discharges appreciable quantities of ground water high in sodium chloride to the Smoky Hill River and some of its tributaries.

The Kansas River water has a wider range in quality than Missouri River water because the drainage area of the Kansas River is smaller and therefore variation in climatic and meteorologic conditions within the basin have a greater effect. Figure 15 shows the relation of streamflow to alkalinity, chloride, and turbidity for samples analysed in 1948 by the U. S. Public Health Service (1949). Although the alkalinity and chloride curves are approximately parallel, a positive deviation from one curve is generally accompanied by a negative deviation from the other for discharges less than 5,000 cfs. This relation illustrates the effect of local conditions on the quality of the river water. Above 5,000 cfs the deviation from both curves is in the same direction, which merely indicates the extent of dilution of the ions in solution. River water is generally more mineralized during a rising stage than during a falling stage.

Maximum, minimum, and mean concentrations of selected chemical characteristics and related physical measurements of Kansas River water near Holliday, Kans., 1907-08, are given below (Parker, 1911):

	Maximum (ppm)	Minimum (ppm)	Mean (ppm)
Mean discharge (cfs) ¹	87,000	3,040	8,699
Calcium (Ca)	110	44	73
Magnesium (Mg)	46	2.3	16
Sulfate (SO ₄)	119	28	61
Chloride (Cl)	123	6.5	41
Dissolved solids	672	217	372
Alkalinity (HCO ₃)	388	66	261

¹ Gaging station at Topeka, Kans.

These analyses represent composites of daily samples over approximately 10-day periods. Table 7 gives concentrations for several constituents in recent samples collected during low flow from the Kansas River.